Amendment to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1 (canceled).

Claim 2 (canceled).

Claim 3 (canceled).

Claim 4 (currently amended): A method for operating a first path computation element in a first autonomous system to participate in establishing an inter-autonomous system Traffic Engineering Label Switched Path (LSP) between a head-end node and a tail-end node, said method comprising:

receiving at said first path computation element, virtual shortest path tree information from a second path computation element in a second autonomous system, said virtual shortest path tree information identifying a virtual shortest path tree rooted at said tail-end node and extending to one or more border routers linking said first autonomous system and said second autonomous system, said first autonomous system including said head-end node and said second autonomous system including said tail-end node;

performing computations based on said received virtual shortest path tree information to determine a revised virtual shortest path tree, said revised virtual shortest path tree extending from said tail-end node to one or more border routers linking said first autonomous system and a third autonomous system; and

sending information identifying said revised virtual shortest path tree to a third path computation element in said third autonomous system.

Claim 5 (currently amended): The method of claim 4 wherein said information identifying said revised virtual shortest path tree identifies paths through said one or more border routers ~~of said revised virtual shortest path tree,~~ linking said first autonomous system and said third autonomous system without identifying intermediate nodes between said one or more border routers linking said first autonomous system and said third autonomous system ~~of said revised virtual shortest path tree~~.

Claim 6 (previously presented): The method of claim 5 wherein said information identifying said revised virtual shortest path tree identifies paths through said one or more border routers of said revised virtual shortest path tree, linking said first autonomous system and said third autonomous system and identifies intermediate nodes between said border routers of said revised virtual shortest path tree.

Claim 7 (original): The method of claim 4 further comprising:

prior to receiving said virtual shortest path tree information from said second path computation element, receiving a path computation request from said third path computation element and forwarding said request to said second path computation element.

Claim 8 (currently amended): A method for operating a first path computation element in a first autonomous system to participate in establishing a Multi-Protocol Label Switching (MPLS) Traffic Engineering Label Switched Path (LSP) from a head-end node in said first autonomous system to a tail-end node in a second autonomous system, said method comprising:

receiving at said first path computation element, a path computation request from said head-end node;

transmitting said path computation request to a second path computation element in a third autonomous system bordering said first autonomous system; and thereafter

receiving virtual shortest path tree information from said second path computation element, said virtual shortest path tree information identifying a virtual shortest path tree rooted at said tail-end node in said second autonomous system and extending to one or more border routers connected in both said first autonomous system and said third autonomous system.

Claim 9 (original): The method of claim 8 further comprising:

using said virtual shortest path tree information to compute a path of said MPLS Traffic Engineering LSP from said head-end node to said tail-end node.

Claim 10 (original): The method of claim 9 further comprising:

sending information identifying said path to said head-end node.

Claim 11 (currently amended): The method of claim 10 wherein said information identifying said path identifies said one or more border routers connected in both of said first autonomous system and said third autonomous system ~~of said path~~ without identifying intermediate nodes between said one or more border routers connected in both said first autonomous system and said third autonomous system.

Claim 12 (currently amended): The method of claim 10 wherein said information identifying said path identifies said one or more border routers connected in both of said first autonomous system and said third autonomous system ~~of said path~~ and intermediate nodes between said one or more border routers connected in both of said first autonomous system and said third autonomous system.

Claim 13 (currently amended): A method for operating a first path computation element in a first area to participate in establishing a Multi-Protocol Label Switching (MPLS) Traffic Engineering Label Switched Path (LSP) from a head-end node in said first area to a tail-end node in a second area, said method comprising:

computing at said first path computation element a virtual shortest path tree rooted at said head-end node and extending to one or more border routers connected to said first area and to a third area; and

sending information identifying said virtual shortest path tree to a second path computation element in a second area and operating on a border router connected in both said third area and said second area.

Claim 14 (previously presented): The method of claim 13 further comprising:

receiving information identifying a path of said MPLS Traffic Engineering LSP from said second path computation element; and

notifying said head-end node.

Claim 15 (previously presented): The method of claim 13 wherein said first path computation element operates on said one or more border routers connected in both said first area and said third area.

Claim 16 (currently amended): A method for operating a first path computation element connected in a first area and a second area to participate in establishing a Multi-Protocol Label Switching (MPLS) Traffic Engineering Label Switched Path (LSP) from a head-end node in a third area to a tail-end node in said first area, said method comprising:

receiving at said first path computation element, information identifying a virtual shortest path tree rooted at said head-end node and extending to one or more border routers connected in both said third area and said second area;

performing computations to extend said virtual shortest path tree through said second area and said third area; and

identifying a path for said MPLS Traffic Engineering LSP based on said extended virtual shortest path tree.

Claim 17 (currently amended): The method of claim 16 wherein receiving comprises:

receiving said information identifying said virtual shortest path tree from a second path computation element connected in both said second area and said third area.

Claim 18 (currently amended): The method of claim 16 further comprising:

sending information identifying said path for said MPLS traffic Engineering LSP to said head-end node.

Claim 19 (canceled).

Claim 20 (canceled).

Claim 21 (canceled).

Claim 22 (currently amended): A method for operating a first path computation element in a first area to participate in establishing an inter-area Traffic Engineering Label Switched Path (LSP) between a head-end node and a tail-end node, said method comprising:

receiving at said first path computation element, virtual shortest path tree information from a second path computation element in a second area, said virtual shortest path tree information identifying a virtual shortest path tree rooted at said tail-end node and extending to

one or more border routers linking said first area and said second area, said first area including said head-end node and said area autonomous system including said tail-end node;

performing computations based on said received virtual shortest path tree information to determine a revised virtual shortest path tree, said revised virtual shortest path tree extending from said tail-end node to one or more border routers linking said first area and a third area; and

sending information identifying said revised virtual shortest path tree to a third path computation element in said third area.

Claim 23 (currently amended): The method of claim 22 wherein said information identifying said revised virtual shortest path tree identifies paths through said one or more border routers of said revised virtual shortest path tree, linking said first autonomous system and said third autonomous system without identifying intermediate nodes between said border routers linking said first area and said third area~~of said revised virtual shortest path tree~~.

Claim 24 (previously presented): The method of claim 23 wherein said information identifying said revised virtual shortest path tree identifies paths through said one or more border routers of said revised virtual shortest path tree, linking said first autonomous system and said third autonomous system and identifies intermediate nodes between said border routers of said revised virtual shortest path tree.

Claim 25 (original): The method of claim 24 further comprising:

prior to receiving said virtual shortest path tree information from said second path computation element, receiving a path computation request from said third path computation element and forwarding said request to said second path computation element.

Claim 26 (currently amended): A method for operating a first path computation element in a first area to participate in establishing a Multi-Protocol Label Switching (MPLS) Traffic

Engineering Label Switched Path (LSP) from a head-end node in said first area to a tail-end node in a second area, said method comprising:

receiving at said first path computation element, a path computation request from said head-end node;

transmitting said path computation request to a second path computation element in a third area bordering said first area; and thereafter

receiving virtual shortest path tree information from said second path computation element, said virtual shortest path tree information identifying a virtual shortest path tree rooted at said tail-end node in said second area and extending to one or more border routers connected in both said first area and said third area, said virtual shortest path tree rooted at the MPLS Traffic Engineering LSP tail-end node.

Claim 27 (original): The method of claim 26 further comprising:

using said virtual shortest path tree information to compute a path of said MPLS Traffic Engineering LSP from said head-end node to said tail-end node.

Claim 28 (currently amended): The method of claim 27 further comprising:

sending information identifying said computed path of said MPLS Traffic Engineering LSP to said head-end node.

Claim 29 (original): The method of claim 28 wherein said information identifying said path identifies border routers of said path without identifying intermediate nodes between said border routers.

Claim 30 (original): The method of claim 28 wherein said information identifying said path identifies border routers of said path and intermediate nodes between said border routers.

Claim 31 (canceled).

Claim 32 (canceled).

Claim 33 (canceled).

Claim 34 (currently amended): A ~~computer readable storage medium~~ computer-readable medium storing executable codes ~~encoded with a computer program product for storing computer executable codes~~ for operating a first path computation element in a first autonomous system to participate in establishing an inter-autonomous system Traffic Engineering Label Switched Path (LSP) between a head-end node and a tail-end node, ~~said product~~ comprising:

code that causes receipt of virtual shortest path tree information from a second path computation element in a second autonomous system, said virtual shortest path tree information identifying a shortest path tree rooted at said tail-end and extending to one or more border routers linking said first autonomous system and said second autonomous system;

code that causes performance of computations based on said received virtual shortest path tree information to determine a revised virtual shortest path tree, said revised virtual shortest path tree extending from said tail-end node to one or more border routers linking said first autonomous system and a third autonomous system; and

code that causes sending of information identifying said revised virtual shortest path tree to a third path computation element in said third autonomous system.

Claim 35 (currently amended): The ~~computer readable storage~~ computer-readable medium of claim 34 wherein said information identifying said revised virtual shortest path tree identifies paths through border routers of said revised virtual shortest path tree without identifying intermediate nodes between said border routers of said revised virtual shortest path tree.

Claim 36 (currently amended): The ~~computer readable storage~~ computer-readable medium of claim 35 wherein said information identifying said revised virtual shortest path tree identifies paths through border routers of said revised virtual shortest path tree and identifies intermediate nodes between said border routers of said revised virtual shortest path tree.

Claim 37 (currently amended): The ~~computer readable storage~~ computer-readable medium of claim 34 further comprising:

code that, prior to receipt of said virtual shortest path tree information from said second path computation element, causes receipt of a path computation request from said third path computation element and forwarding said request to said second path computation element.

Claim 38 (currently amended): A ~~computer readable storage~~ computer-readable medium ~~encoded with a computer program product for~~ storing ~~computer~~ executable codes for operating a first path computation element in a first autonomous system to participate in establishing a Multi-Protocol Label Switching (MPLS) Traffic Engineering Label Switched Path (LSP) from a head-end node in said first autonomous system to a tail-end node in a second autonomous system, ~~said product~~ comprising:

code that causes receipt of a path computation request from said head-end node;

code that causes transmission of said path computation request to a second path computation element in a third autonomous system bordering said first autonomous system; and

code that causes receipt of virtual shortest path tree information from said second path computation element, said virtual shortest path tree information identifying a virtual shortest path tree rooted at said tail-end node and extending to one more border routers connected in both said first autonomous system and said third autonomous system.

Claim 39 (currently amended): The ~~computer readable storage~~ computer-readable medium of claim 38 further comprising:

code that causes use of said virtual shortest path tree information to compute a path of said MPLS Traffic Engineering LSP from said head-end node to said tail-end node.

Claim 40 (currently amended): The ~~readable storage~~ computer-readable medium of claim 39 further comprising:

code that causes sending of information identifying said path to said head-end node.

Claim 41 (currently amended): The ~~computer readable storage~~ computer-readable medium of claim 40 wherein said information identifying said path identifies border routers of said path without identifying intermediate nodes between said border routers.

Claim 42 (currently amended): The ~~computer readable storage~~ computer-readable medium of claim 40 wherein said information identifying said path identifies border routers of said path and intermediate nodes between said border routers.

Claim 43 (currently amended): A ~~computer readable storage~~ computer-readable medium ~~encoded with a computer program product for~~ storing ~~computer~~ executable codes for operating a first path computation element in a first area to participate in establishing a Multi-Protocol Label Switching (MPLS) Traffic Engineering Label Switched Path (LSP) from a head-end node in said first area to a tail-end node in a second area, ~~said product~~ comprising:

code that causes computation of a virtual shortest path tree rooted at said head-end node and extending to one or more border routers connected to said first area and to a third area between said first area and said third area; and

code that causes sending of information identifying said virtual shortest path tree to a second path computation element operating on a border router connected in both said third area and said second area.

Claim 44 (currently amended): The ~~computer readable storage~~ computer-readable medium of claim 43 further comprising:

code that causes receipt of information identifying a path of said MPLS Traffic Engineering LSP from said second path computation element; and

code that causes notification of said head-end node of said path.

Claim 45 (currently amended): The ~~computer readable storage~~ computer-readable medium of claim 43 wherein said first path computation element operates on a border router connected in both said first area and said third area.

Claim 46 (currently amended): A ~~computer readable storage~~ computer-readable medium ~~encoded with a computer program product for~~ storing ~~computer~~ executable codes for operating a first path computation element connected in a first area and a second area to participate in establishing a Multi-Protocol Label Switching (MPLS) Traffic Engineering Label Switched Path (LSP) from a head-end node in a third area to a tail-end node in said first area, ~~said product~~ comprising:

code that causes receipt of information identifying a virtual shortest path tree rooted at said head-end node and extending to one or more border routers connected in both said third area and said second area;

code that causes performance of computations to extend said virtual shortest path tree through said second area and said third area; and

code that causes identification of a path for said MPLS Traffic Engineering LSP based on said extended virtual shortest path tree.

Claim 47 (currently amended): The ~~computer readable storage~~ computer-readable medium of claim 46 wherein said code that causes receipt comprises:

code that causes receipt of said information from a second path computation element connected in both said second area and said third area.

Claim 48 (currently amended): The ~~computer readable storage~~ computer-readable medium of claim 46 further comprising:

code that causes sending of information identifying said path to said head-end node.

Claim 49 (canceled).

Claim 50 (canceled).

Claim 51 (canceled).

Claim 52 (currently amended): A ~~computer readable storage~~ computer-readable medium ~~encoded with a computer program product for~~ storing computer-~~executable~~ codes for operating a first path computation element in a first area to participate in establishing an inter-area Traffic Engineering Label Switched Path (LSP) between a head-end node and a tail-end node, ~~said product~~ comprising:

code that causes receipt of virtual shortest path tree information from a second path computation element in a second area, said virtual shortest path tree information identifying a shortest path tree rooted at said tail-end and extending to one or more border routers linking said first area and said second area;

code that causes performance of computations based on said received virtual shortest path tree information to determine a revised virtual shortest path tree, said revised virtual shortest path tree extending from said tail-end node to one or more border routers linking said first area and a third area; and

code that causes sending of information identifying said revised virtual shortest path tree to a third path computation element in said third area.

Claim 53 (currently amended): The ~~computer readable storage~~ computer-readable medium of claim 52 wherein said information identifying said revised virtual shortest path tree identifies paths through border routers of said revised virtual shortest path tree without identifying intermediate nodes between said border routers of said revised virtual shortest path tree.

Claim 54 (currently amended): The ~~computer readable storage~~ computer-readable medium of claim 53 wherein said information identifying said revised virtual shortest path tree identifies paths through border routers of said revised virtual shortest path tree and identifies intermediate nodes between said border routers of said revised virtual shortest path tree.

Claim 55 (currently amended): The ~~computer readable storage~~ computer-readable medium of claim 52 further comprising:

code that, prior to receipt of said virtual shortest path tree information from said second path computation element, causes receipt of a path computation request from said third path computation element and forwarding said request to said second path computation element.

Claim 56 (currently amended): A ~~computer readable storage~~ computer-readable medium ~~encoded with a computer program product for~~ storing ~~computer~~ executable codes for operating a first path computation element in a first area to participate in establishing a Multi-Protocol Label

Switching (MPLS) Traffic Engineering Label Switched Path (LSP) from a head-end node in said first area to a tail-end node in a second area, ~~said product~~ comprising:

code that causes receipt of a path computation request from said head-end node;

code that causes transmission of said path computation request to a second path computation element in a third area bordering said first area; and

code that causes receipt of virtual shortest path tree information from said second path computation element, said virtual shortest path tree information identifying a virtual shortest path tree rooted at said tail-end node and extending to one more border routers connected in both said first area and said third area.

Claim 57 (currently amended): The ~~computer readable storage~~ computer-readable medium of claim 56 further comprising:

code that causes use of said virtual shortest path tree information to compute a path of said MPLS Traffic Engineering LSP from said head-end node to said tail-end node.

Claim 58 (currently amended): The ~~computer readable storage~~ computer-readable medium of claim 56 further comprising:

code that causes sending of information identifying said path to said head-end node.

Claim 59 (currently amended): The ~~computer readable storage~~ computer-readable medium of claim 58 wherein said information identifying said path identifies border routers of said path without identifying intermediate nodes between said border routers.

Claim 60 (currently amended): The ~~computer readable storage~~ computer-readable medium of claim 58 wherein said information identifying said path identifies border routers of said path and intermediate nodes between said border routers.

Claim 61 (canceled).

Claim 62 (canceled)

Claim 63 (canceled).

Claim 64 (canceled).

Claim 65 (currently amended): Apparatus for operating a first path computation element in a first autonomous system to participate in establishing an inter-autonomous system Traffic Engineering Label Switched Path (LSP) between a head-end node and a tail-end node, said method comprising:

means for receiving at the first path computation element, virtual shortest path tree information from a second path computation element in a second autonomous system, said virtual shortest path tree information identifying a virtual shortest path tree rooted at said tail-end node and extending to one or more border routers linking said first autonomous system and said second autonomous system, said first autonomous system including said head-end node and said second autonomous system including said tail-end node;

means for performing computations based on said received virtual shortest path tree information to determine a revised virtual shortest path tree, said revised virtual shortest path tree extending from said tail-end node to one or more border routers linking said first autonomous system and a third autonomous system; and

means for sending information identifying said revised virtual shortest path tree to a third path computation element in said third autonomous system.

Claim 66 (currently amended): Apparatus for operating a first path computation element in a first autonomous system to participate in establishing a Multi-Protocol Label Switching (MPLS) Traffic Engineering Label Switched Path (LSP) from a head-end node in said first autonomous system to a tail-end node in a second autonomous system, said method comprising:

means for receiving at the first path computation element, a path computation request from said head-end node;

means for transmitting said path computation request to a second path computation element in a third autonomous system bordering said first autonomous system; and

means for receiving virtual shortest path tree information from said second path computation element, said virtual shortest path tree information identifying a virtual shortest path tree rooted at said tail-end node in said second autonomous system and extending to one or more border routers connected in both said first autonomous system and said third autonomous system.

Claim 67 (currently amended): Apparatus for operating a first path computation element in a first area to participate in establishing an inter-area Traffic Engineering Label Switched Path (LSP) between a head-end node and a tail-end node, said method comprising:

means for receiving at said first path computation element, virtual shortest path tree information from a second path computation element in a second area, said virtual shortest path tree information identifying a virtual shortest path tree rooted at said tail-end and extending to one or more border routers linking said first area and said second area, said first area including said head-end node and said second area including said tail-end node;

means for performing computations based on said received virtual shortest path tree information to determine a revised virtual shortest path tree, said revised virtual shortest path tree extending from said tail-end node to one or more border routers linking said first area and a third area; and

means for sending information identifying said revised virtual shortest path tree to a third path computation element in said third area.

Claim 68 (currently amended): Apparatus for operating a first path computation element in a first area to participate in establishing a Multi-Protocol Label Switching (MPLS) Traffic Engineering Label Switched Path (LSP) from a head-end node in said first area to a tail-end node in a second area, said method comprising:

means for receiving at said first path computation element, a path computation request from said head-end node;

means for transmitting said path computation request to a second path computation element in a third area bordering said first area; and

means for receiving virtual shortest path tree information from said second path computation element, said virtual shortest path tree information identifying a virtual shortest path tree rooted at said tail-end node in said second area and extending to one or more border routers connected in both said first area and said third area, said virtual shortest path tree rooted at the MPLS Traffic Engineering LSP tail-end node.

Claim 69 (currently amended): Apparatus for operating a first path computation element in a first autonomous system to participate in establishing an inter-autonomous system Traffic Engineering Label Switched Path (LSP) between a head-end node and a tail-end node, said method comprising:

a processor; and

a memory device that stores instructions to be executed by the processor, said instructions comprising:

code that causes receipt at the first path computation element, of virtual shortest path tree information from a second path computation element in a second autonomous system, said virtual shortest path tree information identifying a virtual shortest path tree rooted at said tail-end node and extending to one or more border routers linking said first autonomous system and said second autonomous system, said first autonomous system including said head-end node and said second autonomous system including said tail-end node;

code that causes performance of computations based on said received virtual shortest path tree information to determine a revised virtual shortest path tree, said revised virtual shortest path tree extending from said tail-end node to one or more border routers linking said first autonomous system and a third autonomous system; and

code that causes sending information identifying said revised virtual shortest path tree to a third path computation element in said third autonomous system.

Claim 70 (currently amended): The apparatus of claim 69 wherein said information identifying said revised virtual shortest path tree identifies paths through said one or more border routers linking said first autonomous system and said third autonomous system ~~of said revised virtual shortest path~~ tree without identifying intermediate nodes between said border routers linking said first autonomous system and said third autonomous system ~~of said revised virtual shortest path tree~~.

Claim 71 (currently amended): The apparatus of claim 69 wherein said information identifying said revised virtual shortest path tree identifies paths through said one or more border routers linking said first autonomous system and said third autonomous system ~~of said revised virtual shortest path tree~~ and identifies intermediate nodes between said one or more border routers linking said first autonomous system and said third autonomous system ~~of said revised virtual shortest path tree~~.

Claim 72 (currently amended): Apparatus for operating a first path computation element in a first autonomous system to participate in establishing a Multi-Protocol Label Switching (MPLS) Traffic Engineering Label Switched Path (LSP) from a head-end node in said first autonomous system to a tail-end node in a second autonomous system, said product comprising:

a processor; and

a memory device that stores instructions to be executed by the processor, said instructions comprising:

code that causes receipt at the first path computation element, of a path computation request from said head-end node;

code that causes transmission of said path computation request to a second path computation element in a third autonomous system bordering said first autonomous system; and

code that causes receipt of virtual shortest path tree information from said second path computation element, said virtual shortest path tree information identifying a virtual shortest path tree rooted at said tail-end node in said second autonomous system and extending to one more border routers connected in both said first autonomous system and said third autonomous system.

Claim 73 (previously presented): The apparatus of claim 72 further comprising code that causes use of said virtual shortest path tree information to compute a path of said MPLS Traffic Engineering LSP from said head-end node to said tail-end node.

Claim 74 (currently amended): The apparatus of claim 72 further comprising code that causes sending of ~~information identifying said path~~ said virtual shortest path tree information to said head-end node.